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EUROPEAN ATOMIC ENERGY COMMUNITY — EURATOM

**THE ORGANIZATION OF AND LITERATURE  
ON NUCLEAR RESEARCH IN  
THE SOVIET UNION**

by

G. REICHARDT, Jülich (Germany)

1963



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## FOREWORD

The Euratom Commission at quite an early stage turned its attention to the importance of information about nuclear research conducted in the Iron Curtain countries. This interest was underscored by the publication since the end of 1960 of the *Transatom Bulletin*, in which an attempt is made to list as large a number as possible of translations of such research studies from East European languages, together with precise information on their availability.

The organizational set-up of nuclear research in the Soviet Union is largely a closed book to the Western observer and very little is known of the methods of direct information used there. For this reason Dr. Günther Reichardt, who is well-equipped to talk on the subject, was asked to provide the readers of the *Transatom Bulletin* with an outline of both facets of the problem. (\*)

At the first meeting of librarians working in the nuclear technology libraries of the countries of the European Atomic Energy Community, held in May 1962, Dr. Reichardt gave a highly interesting talk on a subject which is of especial importance to them, namely, the problem of obtaining nuclear research literature from the Soviet Union.

In view of the wide general interest of the topics dealt with, it was felt that the results of the investigation should be made available to a much larger audience, in the form of the enclosed report, which provides a clear picture of the sources and methods used by Soviet authors reporting on nuclear research and at the same time offers a thorough and valuable insight into the importance attached to information facilities within the Soviet Union.

Rudolf BREE

(1) "Direct Information on Nuclear Literature of the Soviet Union", *Transatom Bulletin*, Vol. II, No. 2 (issued in February, 1962)  
"The Organization of Nuclear Research in the Soviet Union" *Transatom Bulletin*, Vol. II, No. 10 (issued in October, 1962).



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# THE ORGANIZATION OF AND LITERATURE ON NUCLEAR RESEARCH IN THE SOVIET UNION

## SUMMARY

This article provides an outline of the present state of information and documentation in the Soviet Union and investigates its innumerable information sources in the field of nuclear research.

An account is given of the many difficulties encountered in the coordination and evaluation of the vast amount of information available.

Note is also made of the fact that only a small percentage of this information reaches the Western scientist, the reasons for which are covered in detail.

At the end of the article the author advances a possible solution to the problem, designed to provide the Western research scientist with better access to specialized Soviet literature.

## 1 — THE ORGANIZATION OF NUCLEAR RESEARCH IN THE SOVIET UNION

The administrative setup required by a large-scale modern field of research inevitably involves one problem which has been widely discussed: given a ramified and diversified structure likely to follow paths of development virtually impossible to predict, such as the scientific establishment serving a particular field of research, to what extent can this structure be moulded into a perspicuous and systematic administrative pattern? Hardly any Western country which possesses high-level bodies for science administration can claim to have grouped all scientific institutes and establishments together within a single administrative setup, for the major national organizations, such as the UKAEA in Great Britain, the Commissariat à l'Énergie Atomique in France, the USAEC or the recently established Joint Committee on Atomic Energy in the USA or the Comitato Nazionale in Italy do not, as a rule, have any jurisdiction over the non- and semi-nationalized research institutes run by industrial and commercial concerns and scientific associations and societies.

The organization of nuclear research in the USSR, too, offers the outsider a many-hued picture, not to mention the large number of aspects which are kept hidden altogether. There is no hint of the monotonous uniform administrative pyramid which the layman would assume to characterize scientific establishments in a centralized state. Despite the continual discussion of the unified nature of Soviet science, respect is apparently accorded in the USSR too, to the fact that scientific research is primarily dependent on the work of individual scientists. Administrative organizations which are themselves non-productive should promote research work or at least not restrict or hamper it.

For this reason, the classical scientific establishments such as universities and academies, with their institutes of physics, nuclear physics, chemistry, physico-chemistry, biology, medicine, metallurgy, materials, energetics and mathematics, are also used in the USSR for the purposes of nuclear research.

## 1.1 — University Institutes

Universities and technical colleges all come under the Ministry of Technical Education of their own republic of the USSR. (It is worth remembering that the USSR is made up of 15 union republics, four autonomous republics outside the RSFSR and three autonomous regions which do not form part of the USSR). There are 218 universities and technical colleges in the Soviet Union <sup>(1)</sup> from which three times as many scientists and engineers graduated in 1961 as in the USA <sup>(2)</sup>. In the RSFSR alone there are 19 universities and 106 technical colleges <sup>(3)</sup>.

Among this plethora of institutes, particular mention should be made of the Institute of Nuclear Physics and the Physics Faculty of Moscow State University, the Chair of Nuclear Physics at the Central Asian State University of Tashkent, the Nuclear Physics Research Laboratory at Kazakhstan University in Alma-Ata, the Siberian Institute of Physics at the University of Tomsk, the Chair of the Structure of Matter at the State University of Uzhgorod and the Institutes of Physics in Leningrad, Kiev and Krasnoyarsk.

## 1.2 — Academy Institutes

The highest level of research, however, is reached in the USSR Academy of Sciences, with its four scientific departments and a technical department with a total of 60 institutes, laboratories, departments and societies. The number of scientific members of the Academy in 1959 amounted to 20,144 <sup>(4)</sup>.

Of particular importance in the field of physics are the institutes of physics, physical problems, theoretical and experimental physics, technical physics, atomic energy, photomeson research, chemical physics, atmospheric physics, biophysics and thermonuclear research in the electro-technical institute, the institutes for high-pressure physics, geophysics, crystallography, geomagnetics and ionospheric and radio-wave propagation, and the commissions for isotope research and cosmic radiation.

Chemistry is covered by the institutes of chemical technology, general and inorganic chemistry, high-molecular compounds, element-organic compounds, the geochemistry and crystal chemistry of rare elements, biochemistry, radium, physical chemistry, together with an isotope research laboratory, organic chemistry and plastics.

In the field of technology, there are institutes for complex transportation problems (nuclear propulsion), the laboratory for reactor instruments and institutes for precision mechanics, power plants, energetics, physical technology, halurgy, automation and telemechanics, semiconductors, metallurgy, with the electrophysical laboratory, rare metals, electrotechnical equipment, engineering, radio electricity, electronics and radiotechnology.

Mathematics are being studied at various institutes belonging to the Academy.

<sup>(1)</sup> Cf. Vysshaya shkola, Osnovnye postanovleniya, prikazy i instruktsii, Moscow, 1957, pp. 18-22.

<sup>(2)</sup> *Izvestia*, 20 December, 1960, taken from *Osteuropa-Naturwissenschaft* 5 (1961), p. 71.

<sup>(3)</sup> Cf. RSFSR. Ministerstvo vysshego i srednego special'nogo obrazovaniya. Obzorny spravochnik vysshikh ychebnykh zavedeniy, Moscow, 1961, p. 309.

<sup>(4)</sup> Cf. Arnold BUCHHOLZ, "Ergebnisse der Sowjetwissenschaft im Jahre 1959" (Soviet Scientific Achievements in 1959) *Osteuropa-Naturwissenschaft* 4 (1960), p. 41.

In the field of biology, there are institutes for botany, cytology, zoology, genetics and biophysics, microbiology, animal morphology, plant physiology and agricultural chemistry, soil science and the Borok Biological Station.

Together with these, there are nine branch academies in the various republics which, together with the USSR Academy of Sciences in Moscow, form a closely-knit administrative network. Mention should be made in particular of the Institutes of Atomic Energy and Physics and of the Physical Technical Institute of the Ukrainian Academy of Sciences in Kiev. The Minsk Energetics Institute comes under the aegis of the Byelorussian Academy of Sciences, while the Kazakh Academy comprises an Institute for Nuclear Research in Alma-Ata. The Institute of Nuclear Physics at Kibrari, near Tashkent, which comes under the Uzbek Academy, includes a general research department, a nuclear physics department, a physico-technical institute and a cosmic radiation laboratory. The Georgian Academy has under its wing an Institute for Physiology in Tiflis and a Physico-Technical Institute in Sukhumi. There are also the Institute of Physics and the Byurakan Astrophysical Observatory, which comes under the Armenian Academy in Erevan, and the Institute of Physics of the Latvian Academy of Sciences. Corresponding institutes engaged on nuclear research also form part of the Estonian Academy in Tartu and of the Georgian Academy in Tiflis.

The Siberian Department of the Academy in Novosibirsk, founded in 1957, is assuming especial importance as a research centre and comprises institutes of nuclear physics, thermophysics, theoretical and applied mechanics, mathematics and computers, automation and electrometry, geology and geophysics, hydrodynamics, high-tension technology, inorganic chemistry, cytology and genetics, experimental biology and medicine, and economics and statistics.

In addition to this main network constituted by the USSR Academy of Sciences, there exist other extensive scientific organizations made up of the institutes, laboratories and research centres of the other three academies.

- 1) The Lenin All-Union Academy of Agronomy, comprising 13 research institutes and a council for the use of atomic energy in agriculture;
- 2) The K. A. Timiryazev Agricultural Academy in Moscow, comprising chairs of agrochemistry, physiology and biochemistry of livestock;
- 3) The USSR Academy of Medical Sciences, comprising 25 institutes. In addition, there are 27 large local clinics and hospitals specializing in radiology and radiomedicine which are generally responsible to the Ministry of National Health.

### **1.3 — Research Fields covered by the Ministries**

Administration of the many other research centres run by industrial or commercial enterprises and which in Western countries constitute the private sector of research is carried out in the Soviet Union by the appropriate specialized Ministries. Military and civil nuclear production, for example, is run by the Ministry of Medium Engineering, while the Stalin Machine-Tool and Instrument Institute comes under the Ministry of Heavy Engineering. Isotopes are widely used in the following metallurgical plants administered by the Ministry of Heavy Engineering: Novotulsk, Kuznetsk, Magnitogorsk, Azovtal, Dzershinsk, Stalino and Makeyevska in the Donets Basin, Ylych near Zhdanov, the Yuzhuralnikel plant of the South Urals Nickel Plant, the Volkov Aluminium Plant and Ore-Processing Combine South at Krivoy-Rog. The Ministry of Economics is responsible for export and import transactions while the Ministry of Geology and Preservation of the Resources of the USSR is responsible for the prospecting, exploration and exploitation of ore and mineral deposits.

#### 1.4 — Atomic Power Plants and Nuclear Research Centres

The Ministry for the Construction of Electric Power Plants is responsible for the administration of the All-Union Research Institute of Electric Power and all-Soviet power plants, together with the Main Division of Atomic Energy, which is responsible for nuclear power plants.

There are research reactors in many towns in the USSR, e.g. Moscow, Leningrad, Kiev, Tiflis, Tashkent, Kharkov, etc., which come under either an academy or a university.

Considering the fact that these various institutes, laboratories and research centres are administered sometimes by a university, technical college or academy and sometimes by an official authority, it will be realized that the major problem facing the organization of nuclear research in the Soviet Union is the coordination of this kaleidoscopic pattern. Various administrative reforms are envisaged in an attempt to solve this problem :

One measure consists in the concentration of funds and research workers by creating nuclear research establishments, of which the USSR has 15 <sup>(1)</sup>.

1) The world's first nuclear power plant, set up at Dubna near Moscow in 1954, comprising five laboratories engaged on the following fields :

- a) high voltage
- b) nuclear problems
- c) neutron physics
- d) nuclear reactions
- e) theoretical physics

The Joint Institute contains a special design office and a computer centre.

- 2) Little Dubna near Minsk;
- 3) The Byeloyarsk Nuclear Power Plant, 40 km east of Sverdlovsk;
- 4) In the Voronezh-Novo-Voronezh area;
- 5) On the Volga;
- 6) In the Urals;
- 7) In the Ulyanovsk Region;
- 8) Lake Miass, in the Chelyabinsk area, nuclear centre similar in size to that at Oak Ridge;
- 9) Atomgrad in Siberia;
- 10) Near Riga, in the Latvian SSR;
- 11) The Obninsk nuclear power plant;
- 12) On the Ob River, south of Novosibirsk;
- 13) Akademgrad on the Oka River, not far from Serpukhov;
- 14) Near Alma-Ata;
- 15) The VVR-M reactor near Moscow.

These nuclear research plants are administered either by an official authority or by the USSR Academy of Sciences or a branch academy of a union republic. Various centres, such as that at Dubna, are controlled by a committee consisting of representatives of Eastern Governments and members of the Joint Institute for Nuclear Research.

<sup>(1)</sup> Cf. Arnold KRAMISH, *Atomic Energy in the Soviet Union*, Stanford Univ. Press, 1959; "Atomforschung", (*Atomic Research*) *Osteuropa-Naturwissenschaft* 5 (1961) p. 37.

## 1.5 — The Problem of Coordination

This diversity of organizational forms points clearly to the need which arose of giving its coordination an institutional basis :

1) The “Main Administration for the Exploitation of Nuclear Energy of the USSR Council of Ministers” was rechristened the “National Committee of the USSR Council of Ministers for the Exploitation of Nuclear Energy” <sup>(1)</sup>.

In this way, the chairman of the Committee was given ministerial status, thus creating at ministry level the prerequisite for establishing a coordinated breakdown by subject and institute.

2) A directive issued by the Central Committee of the Communist Party and the USSR Council of Ministers on 12 April, 1961, provides for the creation of a “State Committee of the USSR Council of Ministers for the Coordination of Scientific Research”, which is to be responsible for “the coordination of the work carried out by the USSR Academy of Sciences, the Academies of Sciences of the union republics, and the ministries and official authorities of the USSR” <sup>(2)</sup>. Scientific development should be promoted in such a way that the concentration of scientific workers and financial resources can be reduced in certain centres, such as Moscow, for example, the staff thus released being then transferred to other centres <sup>(3)</sup>. In addition, a State Committee having the same tasks is provided in each union republic. Within the State Committee of the RSFSR, there is also a commission for information on the industrial uses of isotopes and nuclear radiations. Similar commissions will also be set up in other republics.

3) The USSR Academy of Sciences, as the largest and most important research organization, has decided upon the formation of coordinating councils for its own institutes, to be made up of representatives of various branches of science and organizations.

4) A council for the coordination of complex results obtained in the utilization of atomic energy has been founded at the Ukrainian Academy of Science.

5) The USSR Academy of Sciences is pursuing its task of coordination by means of a research programme covering several years and aimed at guaranteeing a reasonable and appropriate division of labour. It provided a total of 298 research fields with 5030 projects for the year 1958, but in 1959 was focussed on 30 major fields, half of which form part of the most important research areas of nuclear science. These major fields of research are principally made up of the following :

— thermo-nuclear reactions, the nature of elementary particles, solid state physics, semiconductor physics, magnetic physics, nuclear research installations, radiochemistry, radiobiology, isotope applications, radiological protection, space research, genetics, high-speed computers, etc. <sup>(4)</sup>.

These measures are aimed at closing the gaps which are naturally encountered everywhere in the administration of scientific establishments and nuclear research. An attempt is being made to reshuffle the present organizational set-up for science and research, especially in the field of nuclear science, in order to bring about a more uniform and more easily administered system of organization. Every effort is apparently being made in the USSR to overcome the present little-

<sup>(1)</sup> Cf. *Pravda*, 23 December 1960, “Atomforschung”, *Osteuropa-Naturwissenschaft* 5 (1961) p. 37.

<sup>(2)</sup> Cf. Das Staatskomitee des Ministerrats der UdSSR zur Koordinierung der Wissenschaftlichen Forschungsarbeit, *Osteuropa-Naturwissenschaft* 5 (1961), p. 59/62.

<sup>(3)</sup> Cf. *Pravda*, 8 February 1961.

<sup>(4)</sup> Arnold BUCHHOLZ, “Schwerpunktprogramm und Planungsreform der Sowjetwissenschaft” (Main Programme and Planning Reform of Soviet Science), *Osteuropa-Naturwissenschaft* 3 (1959), pp. 118-123.

known discrepancy between the planning of research projects and that of the central institutions which are to carry them out, between the research workers and their tasks on one hand and state control on the other. Nothing has yet been published in the Soviet literature and press as to the extent to which it has proved possible, by means of a judicious division of labour and allocation of responsibilities and autonomous powers, to strike a balance between institutions engaged on related research tasks, nor is there any reference to the degree of success achieved in efforts to reduce the natural rivalry between similar or allied research institutes such as, e.g., the 15 nuclear research centres existing in the Soviet Union.

## **2 — DIRECT INFORMATION TO BE OBTAINED FROM SOVIET NUCLEAR LITERATURE**

### **2.1 — The Importance of Scientific Information in the Soviet Union**

In our age, which has put science and the arts on a pedestal, it is perhaps not surprising that the work of synthesis which can be carried out on the basis of research literature has been neglected and underestimated. There is a certain reluctance to realize that in school and university and, in fact, throughout our entire scientific career, we must make use of the cheapest and most convenient tool for research of any kind, i.e. the available literature.

In the Soviet Union not only is scientific literature turned to account in research as a matter of course, but its utilization is a compulsory preliminary to any research task. As a basis for a time- and money-consuming research project, an inventory is made of results already available, which can only be obtained from a thorough examination of the literature. Because of this requirement, the whole process of seeking out information and putting it in an easily usable form has gained the status of a necessary scientific activity receiving extensive support from the state. The education and process of assimilation of the individual is only one aspect of the policy of the Soviet Union since Lenin; the utilization of literature has also been made possible and easier through libraries and information institutes and is extensively organized by the state. The processing of literature into bibliographies, reference works and abstracts has, thanks to state organizations and state subsidies, taken on such impressive proportions that scientific libraries and information centres have received considerable recognition for the dynamic catalytic effect which their work produces on the further progress of science.

All these factors have contributed to the growth of a large body of information literature which is concentrated particularly on the presentation of the newest lines of research, and it is essential that every library and every documentation centre in all countries acquaint themselves with it and put it to good use.

### **2.2 — Overall Picture of Nuclear Research**

Nuclear literature is to be found, according to subject, under the headings of physics, chemistry, geology, biology, medicine or technology. To this has to be added a considerable amount of mathematical literature and, as marginal topics, certain extracts from publications on international law and the economics of energy production.

A good overall impression of the results of Soviet nuclear research can be derived from the second international United Nations conference on the peaceful applications of atomic energy held in 1958; the conference papers have been published in English in a comprehensive American edition which classifies the papers according to subject, but in the Soviet edition the Soviet con-

tributions were published apart in six volumes, so that the USSR contributions were available separately at the Geneva Conference.

International congresses have been held in the Soviet Union on the following special subjects : photosynthesis (1957), the origin of life on the earth (1957), high energy physics (1959), cosmic rays (1959), macromolecular chemistry (1960), nuclear photography (1960) and biochemistry (1961). These conferences have yielded a large number of conference papers which, when put together, represent a good handbook on each subject; they have been published by the USSR Academy of Sciences normally in Russian only but occasionally also in English translation.

To this can be added all the national conferences on, e.g. solar research (1955), radiochemistry (1955, 1957, 1961), cosmogony and radioastronomy (1955 and 1960), mathematics (1956), luminiscence (1956), the applications of radionuclides (1957), semiconductor physics (1954, 1957, 1959) and dielectrics (1956, 1958), automatic systems (1958), metal fatigue (1958), magnetic hydrodynamics (1958), chromium plating (1958), terpene and terpenoids (1959), field theory and the theory of elementary particles (1960), atomic energy (Tashkent 1960), thermo-electricity (1961), spectroscopy (1961), etc.

### 2.3 — Abstracts and Bibliographies

Unfortunately the Soviet Union does not have a comprehensive collection of abstracts covering the whole field of nuclear literature on a par with "Nuclear Science Abstracts" (USA); instead the relevant sections of collections dealing with physics, chemistry, biology, mathematics, medicine and metallurgy must be referred to separately.

The titles of this material have been published since 1961 in "Ostliteratur" ("Eastern Literature") by the central library of the Jülich Atomic Energy Establishment (German Federal Republic) and appear as series C of the "Documentation on Atomic Energy" (AED) issued by the Gmelin-Institute in Frankfurt/Main. The first issue covers Soviet literature in the fields of nuclear, atomic, molecular and solid state physics. The second issue deals with Eastern literature on radiochemistry and radionuclides. The third issue will deal with Soviet literature on the applications of radionuclides in biology and medicine, and the following issues with Soviet literature on the effects of radiation in biology and medicine, radiation protection, the use of radionuclides in technology and the problem of direct conversion.

It is of great importance for us that the Russian titles of this publication should be given in English translation with a Nuclear Science Abstracts reference; when possible the corresponding translations in English, German and French are also mentioned. The titles are systematically grouped under fairly limited subject categories, so that the specialist can find the literature which interests him in one place.

Beside the Soviet collection of abstracts there are a great number of bibliographies which are published separately in bookform, or as an appendix to a monograph, and which are of great importance. What strikes anyone thumbing quickly through the general national bibliography of the USSR is the large place devoted to bibliographies in the weekly book production of the USSR and the amount of specialized bibliographies which appear every week in the Soviet Union.

Thus there are specialized bibliographies on subjects such as acoustics, chemistry and each subdivision of chemistry, dielectrics, semiconductors, radionuclides in medicine, luminescence and luminescence analysis, mathematics, physics, radioastronomy, welding of heat-resistant alloys, as well as reports from the Joint Institute for Nuclear Research in Dubna and various branches of technology.

This wealth of specialized bibliographies finds its counterpart only in the USA in the lists which are published as USAEC reports.

Another sign of the importance attached to bibliographical work in the Soviet Union is the presence of an abundant bibliography at the end of each scientific book; they often give more than a hundred titles. These "hidden" bibliographies cover, e.g. aerosols, astronautics, automation, fuels, dislocation of crystals, machinetools, production and separation of radionuclides, nuclear meteorology, radiobiology, radiohydrogeology, radiochemistry, radiomedicine, computers, nuclear fuels reprocessing, titanium, transuranium elements, uranium and materials.

Latest books are announced in advance in catalogues. Thus for 1962 the book catalogue of the Leningrad Academy Press has over hundred new titles in the field of nuclear science; the catalogue of the Atomic Press for 1962 has 135 new titles and the catalogues of the daughter academies in the different constituent republics are all full of valuable information on scientific publications due to appear in 1962.

The Soviet National Bibliography issues a weekly index in Russian called "Noviye Knigi" (New Books) which lists books already published or about to be published; the subjects covered include physics, mathematics, chemistry, biology and energetics, including the relevant aspects of nuclear science.

#### **2.4 — Translations**

Out of the 2000 odd scientific and technical journals published in the USSR, more than 80 (i.e., 4%) are translated into English. The most valuable scientific periodicals, i.e., the journals put out by the Academy of Sciences of the USSR and the main specialized journals, in particular chemical journals, are translated. Regarding nuclear physics, the journal "Zhurnal eksperimental' noi i teoreticheskoi fiziki" has appeared in English since 1954 as "Journal of Experimental and Theoretical Physics"; it is of particular importance, providing a monthly haul of more than 50 articles on nuclear and plasma physics.

There are many other good specialized scientific journals the contents of which should prove very useful to nuclear physicists but which have not yet been translated; for instance the proceedings of the Nuclear Physics Institute in Alma-Ata, of the Physics Institute in Riga with a series of contributions on magnetohydrodynamics, the chemical papers of the Academy of Sciences of the Armenian SSR in Erevan, etc.

Compared with the body of US and UK translations, the contributions of other countries are non-existent. No wonder then that English is gaining ever greater acceptance as the only possible common language of scientists.

#### **2.5 — The Organization of Scientific Information in the USSR**

The Soviet Union itself attaches great importance to the task of keeping its own scientists abreast of foreign scientific achievements. A large publishing-house for foreign literature has been set up for this specific purpose. It publishes, in Russian translation, American, German, British and French scientific literature as well as papers on important subjects written in Russian and compiled on the basis of various foreign sources. A special library in Moscow, holding more than two million titles, is responsible for the collection of foreign literature. For rapid information, the Soviet Union relies on weekly bulletins issued in 36 specialized series, which give the Russian scientists a Russian translation of the results published in Western journals.



The widest effect is, however, produced by the Institute for Scientific Information (VINITI), which publishes 22 different journals of abstracts containing about 800,000 abstracts.

All the media mentioned, such as translations from Western languages, title-lists, bibliographies, journals of abstracts, information services, etc., combine to ensure that all interested persons are well informed, comprehensively and with the minimum delay.

## 2.6 — Exchange Schemes

Western countries cannot have complete and direct system of information if they do not propose the establishment of exchange scheme with the relevant institutes and institutions of the Soviet Union with a view to the rapid acquisition of the documents they need. Among these institutions, the most significant are the Academy of Sciences of the USSR in Moscow with its library in Leningrad, the 13 daughter academies in the various union republics, the libraries of the Academy of Medicine and the publishing house of the Academy of Sciences of the USSR. After the revision of the general plan of the Academy covering all research projects and which allowed in 1958 for another 5030 research subjects, a few basic themes were singled out from the 30 salient items in the plan : nuclear physics, astrophysics, solid state physics, semiconductor physics, biophysics, space research, radiochemistry and the chemistry of high pressure and high and low temperatures <sup>(1)</sup>. A summary of "research on elementary particles" by Academician I.E. Tamm appeared in the Journal of the Academy of Science, 1960, **10**, pages 19-22.

The institutes for nuclear physics, theoretical and experimental physics, general physics, astrophysics, automation, chemistry, etc., which all belong to an Academy or university, take an active interest in nuclear research. Among the universities, Moscow, Leningrad, Kiev, Gorky, Dnieprpetrowsk, Kazan, Kharkov, Odessa, Saratov, Usgard and Novossibirsk are the most important owing to their specialized scientific institutes.

The biggest of the 15 nuclear research installations of the Soviet Union, situated at Dubna near Moscow, employs 2500 persons, 500 of them being research scientists. The three laboratories for high energy physics, nuclear physics and theoretical physics are well known for their publications.

A new research centre, "Little Dubna", is being built near Minsk for the Institute of Energetics of the Academy of Sciences of the Byelorussian Republic and a nuclear power station with a total capacity of 420,000 kW is being erected east of Sverdlovsk. All nuclear research centres depend administratively on the "National Committee of the USSR Council of Ministers for the Utilization of Nuclear Energy"; the chairman of this committee is therefore of ministerial rank <sup>(2)</sup>.

It is obvious from the above that the enormous range of information on scientific literature in Soviet Russia is not only a matter for booksellers, but is also important for research scientists themselves, whose rate of progress can be improved and costs pruned if adequate reference material is available. These are the fruits of the Soviet policy which, since the days of Lenin, has placed school and university, technical college and research institute, together with the scientific library, right at the centre of a vast research programme. During the past 44 years of Soviet rule, the utilization of libraries and information has become a habit for Soviet scientists; they have moreover realized that comprehensive information on literature is one of the most important measures of rationalization, which contributes decisively to the increase of their scientific potential. It is a

<sup>(1)</sup> Cf. *Osteuropa-Naturwissenschaft* **3** (1959), vol. 2, p. 119.

<sup>(2)</sup> Cf. *Osteuropa-Naturwissenschaft* **5** (1961), vol. 1, p. 37.

fact that scientific literature and scientific information have at all times the effect of a source of radiation rich in energy capable of producing the greatest and the most powerful chain reactions.

### 3 — ACQUISITION OF SOVIET NUCLEAR LITERATURE \*

#### 3.1 — Scope and Importance of Soviet Nuclear Literature

The two main Geneva conferences on the peaceful uses of atomic energy, the results of the geophysical year 1958 and finally, of course, the successes achieved in space research made it quite plain that the European countries are lagging behind in various spheres. The advances gained by the US and USSR are forcing us to recognize the data and scientific results obtained in these two countries, to direct our gaze beyond national boundaries toward the two large stores of scientific literature in the West and the East and to pay closer attention than hitherto to all references, lists of titles and bibliographies.

At a conference of the European Productivity Agency for the Utilization of Eastern Scientific and Technical Literature, held in Paris on 12 and 13 March 1958, the then Head of the EPA, Dr. Alexander King <sup>(1)</sup>, said that while, before the First World War, 90% of the world's research work was performed in European laboratories, this proportion is estimated to have dropped now to about 40%.

The same trend can be seen in the case of book production, the statistics showing that while a total of 21,000 books are published in Great Britain annually, 17,000 in West Germany and 24,000 in Japan, the Soviet Union has an annual output of 69,000 <sup>(2)</sup>.

This drop in the number of books published in Europe compared with the rest of the world has its roots not only in the corresponding increase in the research activities of the US, but also in the colossal rise in Soviet output in the field of pure and applied science.

In some scientific fields the number of Russian-language publications is higher than that of those produced in Great Britain, France or Germany, since the output of scientific publications in the Soviet Union rose by 522% in the period 1950 through 1961 <sup>(3)</sup>.

#### 3.2 — Insufficient Knowledge Among Western Scientific Circles

Whereas the Soviet Union is assiduously applying itself to the creation of well-organized documentation centres of international scope, the leading Western abstract publications and bibliographies, together with the methods used for obtaining material, have for the most part adhered to a traditional position, which confines itself to information and reference literature published in English and the language of the country in which the library is located.

As an example of this we can quote the German general index of foreign journals and periodicals which now appears in instalments and which gives under the letter A only 36.5% of all the Soviet journals listed in the Soviet bibliography of periodicals. Analysis of the Chemical

(\*) Paper read to librarians of Euratom nuclear research centres at Ispra on 22 May 1962.

(1) Cf. EPA/D/4560, 12 February 1958.

(2) Based on UNESCO statistics quoted from a paper entitled "International and Supranational Collaboration in the Field of Documentation and Information", read by Dr. J.E. Humblet, Secretary General of the FID, at the 13th annual meeting of the German Documentation Society in Bad Dürkheim on 11 October 1961.

(3) Die naturwissenschaftliche Forschung, ihre Organisation und Fachkräfte in der UdSSR. In : *Technische Literatur aus der Sowjetunion* 3 (1962) No. 5, p. 11.

Abstracts shows that only 14% of all the abstracts published are taken from Soviet sources, and it is only during the last five years that Nuclear Science Abstracts and Biological Abstracts have begun to pay greater attention to Soviet specialized literature and to include cover-to-cover translation. Our own observations have revealed that 15% of the contents of the 1962 volumes consist of abstracts of Soviet material.

The course taken by American, German and English abstract publications therefore shows that the colossal increase in the number of abstracts has not resulted in a similar increase in the amount of Soviet scientific material thus made available. The most pointed criticism of this narrow-mindedness was levelled by the American representative of the National Science Foundation, Ralph E. O'dette <sup>(1)</sup> in the following words: "We are as provincial as any other nation in ignoring information produced in other countries".

We are therefore, all faced with the task of finding a way out of this provincial narrowness and unscientific negligence.

As regards scientific literature published in Slavonic languages, our ignorance assumes particularly acute proportions, since only a handful of Western scientists and librarians possess any knowledge of Russian.

An attempt was made to solve these language difficulties by means of a vast translation programme, which now provides cover-to-cover translations of about 80 journals, most of them in English. A vast number of more or less comprehensive lists of those periodicals which have been translated and those which have not <sup>(2)</sup> together with many general indexes of the original Russian and Soviet journals available in, e.g., Belgium, Finland, France, Germany, Great Britain, Sweden and the US are some of the means by which access is sought to Soviet works. Journals throughout the world, such as "Technical Literature from the Soviet Union", published by the OECD since 1960, contain all kinds of references to Soviet scientific and technical publications, but these references are only to translations and are restricted to three to five translations per volume.

In addition, the OECD, the EPA and the National Science Foundation, after negotiations lasting four years, have set up the European Translation Centre (ETC) in Delft, in the Netherlands, which, by means of various contributors in the different European countries, is to collect translations and act as a general translation reference library and exchange centre for translations from the US.

In the German Federal Republic translations of material relating to the specialized fields with which we are concerned are collected and filed in the atomic energy documentation section of the Gmelin Institute in Frankfurt/Main. For purposes of publication translations of nuclear material from the Soviet Union are carried out by Euratom and made available to all interested parties in the "Transatom Bulletin".

It might therefore be thought that the problem of the inaccessibility of Soviet specialized literature was thus solved, and with it that of the dissemination of Soviet scientific data, in view of the fact that the translation work is being organized and financed by various parties.

<sup>(1)</sup> *Science*, 29 March 1957.

<sup>(2)</sup> Lists of periodicals are put out by the National Science Foundation, the National Lending Library, the American Society of Chemical Engineers, the Geochemical Society, the EPA of 17.2.1958, the Instrument Society of America, the Consultants Bureau, the Massachusetts Institute of Technology, the American Institute of Physics, the American Mathematical Society, the National Research Council Library, the Gmelin-Institute, the Library of Congress etc.

### 3.3 — Inadequate Supply of Soviet Scientific Literature

Unfortunately, however, this attempt to make specialized Soviet literature available to the Western reader by means of translations has eclipsed the primary problem to be faced, namely, that of acquiring the material in the first place, for one of the main reasons for our ignorance of Soviet research work is the fact that copies of the original material are only available on a limited scale in our libraries, coupled with the difficulty or even impossibility of obtaining specialized Soviet literature on nuclear research.

Moreover, since the two Geneva conferences and the international conferences on high-energy physics, cosmic radiation, nuclear photography, biochemistry, etc., which were held in the Soviet Union in the last few years, there has been a considerable increase in the demand for Soviet material.

There is, however, a considerable school of thought which is of the opinion that this need is adequately covered by the 80 journals now being translated, which make up only 4% of the total Soviet output of scientific and technical periodicals, and in 1958, some leading research organizations even maintained that all these difficulties of making Soviet scientific literature available would be surmounted in two or three years. This did not, however, take account of the fact that these translations reflect only a fraction of the nuclear research actually carried out in the Soviet Union.

These translations provide valuable assistance but are only a start, for they do not cover such valuable work as that carried out by the Institute for Nuclear Research in Alma-Ata, the Institute of Physics in Riga, all the material published by the branch academies of natural sciences in the various union republics, most of the reports of the international and numerous Soviet conferences and many other publications.

The mounting financial and procurement statistics put out by libraries and procurement agencies are, whether by accident or design, misleading in that they fail to point out that by no means all the important material published in the scientific field in the Soviet Union is acquired and that a large amount of the material published weekly is not usually available in our libraries.

A positive feature of the matter is that certain bookshops throughout Europe have begun dealing in Russian-language material during the last five years and it is now possible to obtain such literature on the normal market and to borrow it from the libraries of technical colleges and other bodies. The number of agencies of the Mezhdunarodnaya Kniga (International Book Centre) throughout Europe has increased and a fairly comprehensive selection of scientific literature can now be obtained through them. We are receiving offers for supplies of the latest material from the Soviet Union and even — albeit more seldom — rare books. The general demand for specialized Soviet literature to be observed in Europe since 1957 has paved the way for improved methods of procurement and a certain improvement in the accessibility of this material, coupled with an increase in interest, is to be noted.

However, the material offered and available must be correlated with that which is actually printed, published and duplicated in the USSR, but neither the material itself nor the annual reports and statistics of the major Western libraries and all other procurement centres contain any references or provide any true critical picture of the situation.

On the other hand it is true that the National Lending Library of the DSIR has been building up a collection of Soviet scientific and technical literature since 1956 and currently subscribes to about 900 Soviet journals and periodicals, while in 1957 223 libraries in Great Britain received a total of only 429 Soviet publications. It is also correct that information centre for

Such a centre could distribute lists of newly-acquired Russian language monographs and periodicals broken down according to the individual subjects coming under the general heading of nuclear science. Finally, the Soviet bibliography of periodicals could be used to compile a list of journals of interest to us which would show the publications which come out in the Soviet Union in the various fields in question. This would provide effective and specialized information about original Soviet material dealing with the nuclear sciences.

However, this calls for specialists combining scientific knowledge with a thorough grasp of documentation work and procurement methods. This is not a job for laymen but rather a new and stimulating challenge, namely, that of providing the basis for the further processes of analysis and translation, and it is a cause to which it would be well worth while paying greater attention than has hitherto been the case.





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